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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/886,654 | 06/21/2001 | John Zajac | A-70178/ESW | 4742 |

7590 07/21/2003

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| EXAMINER |
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CHEN, KIN CHAN

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| ART UNIT | PAPER NUMBER |
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1765

DATE MAILED: 07/21/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/886,654

Applicant(s)

ZAJAC ET AL.

Examiner

Kin-Chan Chen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 June 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 is/are pending in the application.
- 4a) Of the above claim(s) 1 and 2 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 3 and 4 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. This application contains claims 1 and 2 drawn to an invention nonelected with traverse. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aoki et al. (US 5,581,874; hereinafter "Aoki") in view of Hubacek (US 6,451,157).

In a method of etching, Aoki teaches that a wafer may be placed on a pedestal (so-called susceptor in Aoki) in a chamber. A gas containing fluorine may be introduced into chamber through an upper electrode which is positioned substantially parallel to and less than 6 mm from the pedestal. RF power may be applied to the pedestal and / or the upper electrode. The pressure inside the chamber may be maintained at a level

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greater than 1.5 Torr. Aoki teaches exhausting gas from the chamber by an exhausting pump and also teaches maintain the internal pressure to a predetermined pressure level, therefore, it is obvious the gas is exhausted through a pressure regulation valve. See col.10, lines 1-10, 33-35, 66-67; col.11, lines 1-5, 53-55; col.13, lines 30-32.

The claimed invention differs from Aoki by specifying a showerhead electrode (upper electrode). However, it is a well-known electrode used in plasma processing. Hubacek is relied on to show that the showerhead electrode can be used for any type of semiconductor processing apparatus wherein it is desired to distribute process gas over a semiconductor substrate (col. 4, lines 39-44; abstract). Because it is a well-known feature in the art and because it is disclosed by Hubacek, hence, it would have been obvious to one with ordinary skill in the art to use showerhead electrode in the process of Aoki in order to provide their art recognized advantages and thus produce an expected result. Also see Tomoyasu et al. (US 5,888,907) in the record as evidence.

Dependent claim 4 differs from combined prior art by specifying the RF power and gas pressure (accordingly, the ratio). However, RF power and gas pressure are commonly determined by routine experiment in the art of plasma etching, it would have been obvious to one of ordinary skilled in the art to determine the suitable RF power and gas pressure through routine experimentation in the combined prior art in order to obtain the best etched product achievable.

Response to Arguments

4. Applicant's arguments filed June 30, 2003 have been fully considered but they are not persuasive.

Applicant has argued that Aoki pertains to a CVD process and apparatus, there is no etching of silicon as applicant's invention. It is not persuasive. As has been stated in the office action, Aoki teaches etching apparatus and process. The examiner pointed out the passages (col.10, lines 1-10, 33-35, 66-67; col.11, lines 1-5, 53-55; col.13, lines 30-32.). Applicant does not comment on or acknowledge same.

Applicant has argued that Aoki teaches that the chamber pressure is 10^{-6} Torr. In fact, Aoki teaches that the chamber pressure may be 10^{-6} Torr to several Torr (**col. 13, lines 30-32**), which comprises at a level greater than 1.5 Torr.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Tomoyasu et al. (US 5,888,907) teaches a shower head may be used as an upper electrode, see col. 5, lines 44-45.

6. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kin-Chan Chen whose telephone number is (703) 305-0222. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin Utech can be reached on (703) 308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-2934.



Kin-Chan Chen
Primary Examiner
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